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TITLE: Semiconductor device
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Brief Summary Text - BSTX (11):
Especially, the diamond layer doped with some dopants suffers from great amount of lattice defects more heavily than the non-doped diamond layer. Therefore, when a pn junction of diamond layers or a Schottky junction of metal and diamond layers is fabricated to make a diode, a bipolar transistor or field effect transistors, many parasitic surface or interface states occur owing to the highly populated lattice defects. Here, the surface or interface state means an electronic or a hole state at the surface or the interface of the junctions where a lattice defect captures an electron or a hole at a certain energy in the band gap. In an ideal crystal without defects, the band gap defined as the region between the top of the valence band and the bottom of the conduction band has no electronic or hole state. Then the band gap is often called a forbidden band.

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(54) SEMICONDUCTOR DEVICE
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(57) ABSTRACT
Doping a dopant into a diamond semiconductor causes lattice defects. The pn junction diode or the Schottky junction diode made from diamond has low break down voltage and high reverse leakage current owing to the lattice defects. A non-doped or low doped diamond layer with high resistivity is epitaxially grown between the N-type diamond layer and the p-type diamond layer in the pn junction diode or between the metal layer and the doped diamond layer in the Schottky diode. The intermediate layer brightens the break down voltage and decreases the reverse leakage current.
13 Claims, 2 Drawing Sheets

U	I	Document ID	Issue Date	Pages	Title
72	<input type="checkbox"/>	US 5132749 A	19920721	9	Semiconductor device
73	<input type="checkbox"/>	US 5126277 A	19920630	7	Method of manufacturing a semiconductor resistor
74	<input type="checkbox"/>	US 5115458 A	19920519	10	Reducing dark current in charge
75	<input type="checkbox"/>	US 5094693 A	19920310	6	Doped zinc oxide-based pigment
76	<input type="checkbox"/>	US 5093704 A	19920303	20	Semiconductor device having a band gap being continuously

Diagram showing a cross-section of a semiconductor device. It consists of a diamond substrate (1) with a p-diamond layer (2) on top. A metal layer (3) is on top of the p-diamond layer. A Schottky junction (4) is formed between the metal layer (3) and the p-diamond layer (2). A voltage source (5) is connected to the metal layer (3) and the p-diamond layer (2).